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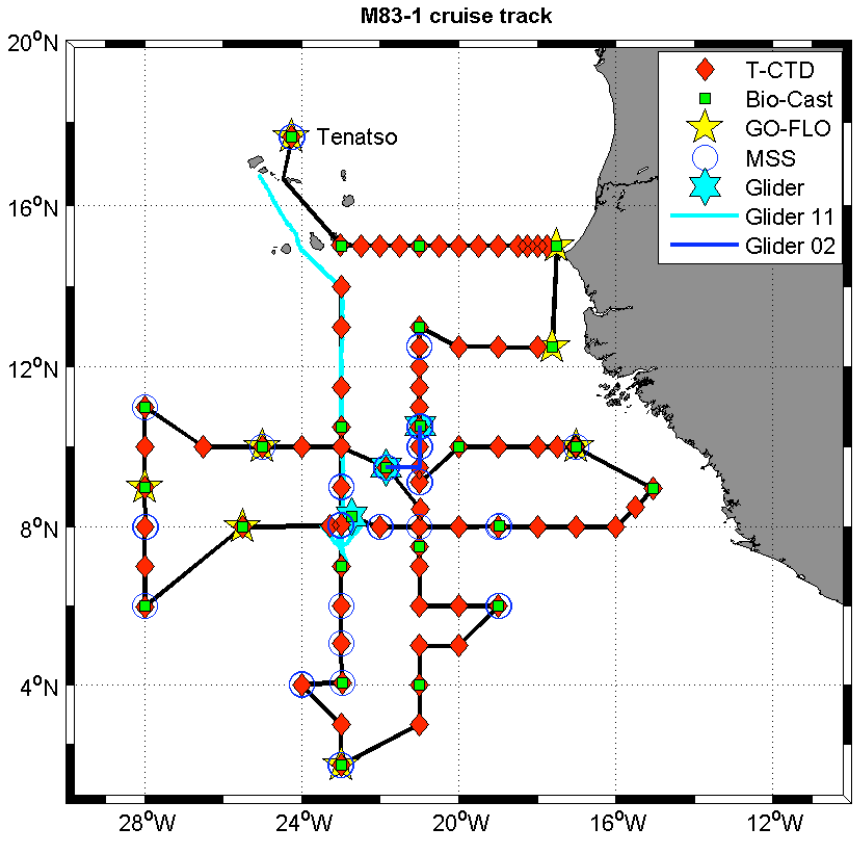
SFB 754

Short Cruise Report
Cruise No. 83, Leg 1

October 14 – November 13, 2010
Las Palmas (Spanien) – Mindelo (Cape Verde Islands)

Chief Scientist: Prof. Dr. Martin Visbeck
Captain: Walter Baschek



1.1 Objectives

During leg M83/1 a combined chemical, physical and biological oceanographic research expedition took place in northeastern tropical Atlantic to better understanding the variability of tropical oxygen minimum zones within the framework of the Kiel based SFB 754 (Climate – Biogeochemical interactions in the tropical Oceans). The main goal of the leg M83/1 is to resurvey the purposeful tracer release patch about 2.5 years after its injection in April 2008 at 8°N 23°W. Secondary objectives include water mass variability and oxygen/nutrient/transient tracer distributions in the survey region. Thirdly several aspects of the biogeochemical cycles in conjunction with oxygen minimum zones are investigated. The cruise will also help to delineate water mass transport pathways within the shallow subtropical cell with a particular focus on the exchanges between the Guinea upwelling region and the tropical ocean interior.
The specific goals are to:

- Document the lateral and vertical distribution and spreading rates of the tracer 30 months after its deployment.
- Determine the diapycnal mixing rate from microstructure measurements.
- Compilation of a detailed and dense map of the oxygen distribution in the region.
- Examine changes in redox sensitive species (IO_3-) and quantify concentrations, fluxes and rates of key trace elements (H_2O_2, Fe(II), O_2-, Fe, Cu, Mn).
- Investigate and conceptualize responses of the pelagic community on OMZ-induced changes in the nutrient stoichiometry, in terms of phytoplankton biomass, its taxonomical composition and the stoichiometry of zooplankton.
- Investigate the microbial community and its responses to changes in dissolved oxygen with regard to nitrogen fixation and nitrous oxide production.

1. 2 Narrative

October 14-17: Left Las Palmas on time and embarked on three day transit to the Cape Verde Islands with echo sounder tests and CTD / GO-FLO trial enroute. Arrived at 17°39'N 24°15'W (TENATSO) close to midnight and sampled with CTD, GO-FLO, Microstructre profiles and recovered PIES until October 18 at 12:30 pm. On October 19 Mr. Aase and Mr. Eriksen left METEOR in Praia.
October 18-21: Performed a CTD survey section along 15°N between 23°W and 17°30W on the shelf near Dakar. There the 12 parallel mesocosm experiments were started with surface water
October 22-23: After a GO-FLO cast from the shelf at 12°30'N 17°37'W we began a short section towards the west until 21°W.
October 23-25: Embarked on a southward section along 21°W from 13°N until 9°N. On October 24 we released a microstructure glider at 10°30'N and 21°W to be picked up later.
October 25-26: Turned east along 10°N 20°W to the easternmost station of the cruise at 17°W and 450m water depth with full sampling including GO-FLO.
October 27-30: After transit to 9°N 15°W on the shelf of Guinea embarked on the nominal 8°N section towards the west until 26°W. During the section we recovered a glider on October 29:

near 23°W, which had spent 80 days at sea and set the record for our longest mission of a SLOCUM glider.
October 31-November 2: We began a northward section at 6°N along 28°W with a 60 nm station spacing until we reached 11°N.
November 3-4: Eastward transect along 10°N. During the morning of November 4 at 9°30N 21°50W we recovered the micro-structure glider during perfect weather conditions. A detailed inspection revealed that water had entered into the micro-rider pressure case. However we were able to obtain 5 days of micro structure data before the leak occurred.
November 4-7: Continued the southern part of the 21°W section down to 3°N with a small eastward D-tour until 19°W including a deep CTD cast to the bottom in 4600m deep water.
November 8: Reached at 5:00 am the southernmost station at 2°N and performed full sampling including the last GO-FLO station.
November 8-12: Embarked on our last CTD section heading north with the final tracer sampling at 13°N and the last CTD cast at 14°N 23°W. From there transit to the port of arrival in Mindelo.

1.3 Summary

All the main goals of the cruise were met. 103 CTD, 24 Plankton nets hauls, 8 GO-FLO stations and 23 micro structure casts allowed for excellent sampling of the tracer patch and oxygen distributions. Simultaneous measurements of biochemical parameters provide a detailed sample base for the analysis of nutrient and redox sensitive upper ocean processes. The vertical tracer distribution together with micro structure data from the ship and glider as well as shipboard underway ADCP measurement allow for a robust estimate of the oceans vertical mixing in a subtropical eddying regime.

1. 4 Acknowledgements

We like to thank captain Walter Baschek, his officers and crew of RV METEOR for their support of our measurement program and for creating a very friendly and professional work atmosphere on board. The ship time of METEOR was provided by the German Science Foundation (DFG) within the core program METEOR/MERIAN. Financial support for the different projects carried out during the cruise was mostly provided though the collaborative research program SFB 754 (Climate – Biogeochemical interactions in the tropical Oceans) supported by the German Science Foundation (DFG). We also benefited from the participation of P. Silva from the INDP (Cape Verde), J. Ly (Senegal) and S. Diallo CNSHB (Guinea) who helped with the sampling. We gratefully acknowledge all this support.

2 Participants

Name	Discipline	Institution
Visbeck, Martin	Chief scientist	IFM-GEOMAR
Banyte, Donata	CTD-Watch/Salinometer	IFM-GEOMAR
Baustian, Tina	Nitrogen fixation	IFM-GEOMAR
Bieligk, Henner	Tracer	IFM-GEOMAR
Bogner, Boie	Tracer	IFM-GEOMAR
Bracamonte, Seraina	Nitrogen loss	IFM-GEOMAR
Franz, Jasmin	Biochemistry	IFM-GEOMAR
Gleixner, Stephanie	CTD/ADCP	IFM-GEOMAR
Haase, Sabine	Microstructure	IFM-GEOMAR
Hauss, Helena	Mesocosmen	IFM-GEOMAR
Heller, Maija	Redox Species	IFM-GEOMAR
Krahmann, Gerd	ADCP-processing/Glider	IFM-GEOMAR
Link, Rudolf	CTD/ADCP	IFM-GEOMAR
Lohmann, Martina	Technician	IFM-GEOMAR
Löscher, Carolin	Nitrogen fixation/loss	IFM-GEOMAR
Lüttschwager, Gunther	CTD/ADCP	IFM-GEOMAR
Manke, Anne	Tracer	IFM-GEOMAR
Nachtigall, Kerstin	Nutrients	IFM-GEOMAR
Nam Koong, Hansup	Tracer	IFM-GEOMAR
Schaffer, Janin	CTD/ADCP	IFM-GEOMAR
Stange, Karen	Oxygen	IFM-GEOMAR
Stöven, Tim	Tracer	IFM-GEOMAR
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Tanhua, Toste	Tracer	IFM-GEOMAR
Wuttig, Kathrin	Redox Species	IFM-GEOMAR
Raeke, Andreas	Weather technician	DWD
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3 Stationlist

	P#	Stat.	Date	Time	Latitude	Longitude	max. p [db]	Comment
GO-FLO	001	769	17/10/10	23:15	17° 39.01' N	24° 15.01' W	80	Nutrients, Trace Metals (10,20,40)
MSS	001	770	18/10/10	00:03	17° 39.04' N	24° 14.99' W	484	
MSS	002	770	18/10/10	00:33	17° 39.45' N	24° 14.68' W	440	
GO-FLO	002	771	18/10/10	01:33	17° 39.03' N	24° 14.97' W	190	Nutrients, Trace Metals (10, 150, 170)
T-CTD	002	772	18/10/10	02:31	17° 39.03' N	24° 14.96' W	3639	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients, DOM, DNA, Salinity
Plancton net	001	773	18/10/10	05:20	17° 38.98' N	24° 14.97' W	50	
PIES		774	18/10/10	06:18	17° 35.67' N	24° 14.47' W		PIES #165
GO-FLO	003	775	18/10/10	08:47	17° 38.98' N	24° 14.96' W	100	Nutrients, Trace Metals (10)
Bio-CTD	003	776	18/10/10	09:11	17° 38.96' N	24° 15.03' W	400	O2, H2O2/Fe(II), Mn, CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation,N2O, Mn/CDOM, Salinity
GO-FLO	004	777	18/10/10	09:58	17° 38.93' N	24° 15.10' W	700	Nutrients, Trace Metals (450)
Multibeam		778	18/10/10	18:24	16° 37.89' N	24° 28.90' W		
Bio-CTD	004	779	19/10/10	13:21	14° 59.97' N	22° 59.99' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation, CDOM, H2O2, Fe(II)
Plancton net	002	780	19/10/10	13:50	15° 0.19' N	23° 0.29' W	100	
T-CTD	005	781	19/10/10	14:25	15° 0.43' N	23° 0.48' W	1200	Tracer, O2, H2O2/Fe(II), CDOM, Nutrients, CDOM, DNA, Salinity
T-CTD	006	782	19/10/10	18:16	15° 0.13' N	22° 29.96' W	1200	Tracer, O2, H2O2/Fe(II), Nutrients, CDOM, DNA, Salinity
T-CTD	007	783	19/10/10	22:07	15° 0.11' N	22° 0.06' W	1200	Tracer, Nutrients, CDOM, DNA, Salinity, HPLC/POM
T-CTD	008	784	19/10/10	01:58	14° 59.84' N	21° 30.09' W	1200	Tracer, Nutrients, CDOM, DNA, Salinity
Bio-CTD	009	785	20/10/10	05:34	14° 59.96' N	20° 59.97' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	003	786	20/10/10	06:06	14° 59.94' N	20° 59.96' W	50	
T-CTD	010	787	20/10/10	06:46	14° 59.98' N	20° 59.92' W	1200	Tracer, O2, Nutrients, CDOM, DNA, Salinity
T-CTD	011	788	20/10/10	10:19	15° 0.11' N	20° 29.94' W	1200	Tracer, O2, H2O2/Fe(II), CDOM, Nutrients, Salinity
T-CTD	012	789	20/10/10	14:08	15° 0.02' N	20° 0.09' W	1200	Tracer, O2, H2O2/Fe(II), Nutrients, Salinity
T-CTD	013	790	20/10/10	17:50	15° 0.05' N	19° 30.04' W	1200	Tracer, Nutrients, Salinity
T-CTD	014	791	20/10/10	21:31	14° 59.96' N	19° 0.02' W	1200	Tracer, Nutrients, DNA, Salinity
T-CTD bottom	015	792	21/10/10	01:20	14° 59.88' N	18° 30.11' W	2955	Tracer, Nutrients, Salinity
T-CTD bottom	016	793	21/10/10	04:54	14° 59.99' N	18° 15.01' W	2615	no sample
T-CTD bottom	017	794	21/10/10	08:17	15° 0.11' N	18° 0.05' W	2039	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients, Salinity
T-CTD bottom	018	795	21/10/10	11:37	15° 0.01' N	17° 45.01' W	1195	Salinity
Bio-CTD	019	797	21/10/10	14:35	15° 0.01' N	17° 30.01' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation,Salinity
Mesocosm		797	21/10/10	15:00	15° 0.01' N	17° 30.01' W		12 Mesokosmen were filled with surface water
GO-FLO	005	798	22/10/10	06:18	12° 30.06' N	17° 37.36' W	70	Nutrients, Trace Metals (10, 30, 50)
Plancton net	004	799	22/10/10	06:56	12° 30.07' N	17° 37.33' W	50	

Bio-CTD	020	800	22/10/10	07:04	12° 30.07' N	17° 37.33' W	400	O2, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation,Salinity
GO-FLO	006	801	22/10/10	07:47	12° 30.07' N	17° 37.33' W	310	Nutrients, Trace Metals (10, 110, 210)
T-CTD	021	802	22/10/10	10:58	12° 29.99' N	17° 59.99' W	1202	Tracer, O2, H2O2/Fe(II), CDOM, Salinity
T-CTD	022	803	22/10/10	18:16	12° 29.98' N	18° 59.98' W	1200	Tracer, O2, Nutrients, Salinity
T-CTD	023	804	23/10/10	00:33	12° 29.98' N	19° 59.67' W	1200	Tracer, Salinity, Chl-a
Plancton net	005	805	23/10/10	07:34	12° 59.96' N	20° 59.89' W	50	
Bio-CTD	024	806	23/10/10	07:44	12° 59.94' N	20° 59.85' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
T-CTD	025	807	23/10/10	08:50	12° 59.94' N	20° 59.85' W	1201	Tracer, O2, Salinity
T-CTD	026	808	23/10/10	12:31	12° 29.94' N	20° 59.98' W	1200	Tracer, O2, H2O2/Fe(II), CDOM, Salinity
MSS	003	809	23/10/10	13:49	12° 30.15' N	21° 0.12' W	480	
MSS	004	809	23/10/10	14:17	12° 30.58' N	21° 0.30' W	476	
MSS	005	809	23/10/10	14:47	12° 30.98' N	21° 0.55' W	460	
T-CTD	027	810	23/10/10	18:02	11° 59.90' N	21° 0.00' W	1200	Tracer, H2O2/Fe(II), CDOM, DNA, Nutrients
T-CTD	028	811	23/10/10	21:32	11° 29.99' N	21° 0.04' W	1200	Tracer, Salinity
T-CTD	029	812	24/10/10	01:11	11° 0.05' N	20° 59.86' W	1200	Tracer, Salinity
T-CTD	030	813	24/10/10	04:45	10° 29.97' N	21° 0.00' W	1200	Tracer, Salinity
MSS	006	814	24/10/10	05:49	10° 30.07' N	20° 59.94' W	411	
MSS	007	814	24/10/10	06:32	10° 30.62' N	20° 59.47' W	421	
MSS	008	814	24/10/10	07:00	10° 30.92' N	20° 59.22' W	468	
Plancton net	006	815	24/10/10	07:23	10° 31.10' N	20° 59.07' W	100	
Bio-CTD	031	816	24/10/10	07:33	10° 31.13' N	20° 59.10' W	400	H2O2/Fe(II), Mn, CDOM, DOM, Chl-a, POM, DNA, N2-fixation
MSS	009	817	24/10/10	08:12	10° 31.22' N	20° 59.07' W	502	
MSS	010	817	24/10/10	08:12	10° 31.22' N	20° 59.07' W	475	
MSS	011	817	24/10/10	08:12	10° 31.22' N	20° 59.07' W	427	
GLIDER		818	24/10/10	09:39	10° 31.86' N	20° 58.61' W		
T-CTD	032	819	24/10/10	14:24	9° 59.88' N	21° 0.00' W	1200	Tracer, O2, H2O2/Fe(II), CDOM, Salinity
MSS	012	820	24/10/10	15:31	9° 59.94' N	21° 0.05' W	515	
MSS	013	820	24/10/10	15:45	10° 0.11' N	20° 59.88' W	458	
MSS	014	820	24/10/10	16:49	10° 1.03' N	20° 59.47' W	445	
T-CTD	033	821	24/10/10	20:03	9° 30.00' N	21° 0.02' W	1200	Tracer, Nutrients, DNA, POM/DOC, Salinity
T-CTD	034	822	24/10/10	23:13	9° 7.03' N	20° 59.97' W	1201	Tracer, Salinity
MSS	015	823	25/10/10	00:17	9° 7.12' N	20° 59.91' W	526	
MSS	016	823	25/10/10	00:45	9° 7.30' N	20° 59.47' W	434	
MSS	017	823	25/10/10	01:10	9° 7.44' N	20° 59.10' W	436	
Plancton net	007	824	25/10/10	08:29	9° 59.98' N	19° 59.94' W	100	

Bio-CTD	035	825	25/10/10	08:45	10° 0.03' N	19° 59.86' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
T-CTD	036	826	25/10/10	09:44	10° 0.10' N	19° 59.76' W	1205	Tracer, O2, H2O2/Fe(II), CDOM, Salinity
T-CTD	037	827	25/10/10	16:02	10° 0.03' N	18° 59.99' W	1200	Tracer, O2, H2O2/Fe(II), CDOM, Nutrients, DNA, POM/DOC, Salinity
T-CTD bottom	038	828	25/10/10	22:23	9° 59.99' N	17° 59.99' W	3125	Tracer, Salinity
T-CTD bottom	039	829	26/10/10	03:31	9° 59.85' N	17° 29.80' W	732	Tracer, Nutrients, Salinity Standard (niskin 1-3)
Plancton net	008	830	26/10/10	06:48	10° 0.01' N	16° 59.96' W	50	
GO-FLO	007	831	26/10/10	07:00	9° 59.99' N	16° 59.98' W	90	Nutrients, Trace Metals (10, 30, 50)
Bio-CTD	040	832	26/10/10	07:28	9° 59.97' N	16° 59.98' W	400	O2, H2O2/Fe(II), Mn, CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
GO-FLO	008	833	26/10/10	08:17	9° 59.95' N	16° 59.99' W	310	Nutrients, Trace Metals (10, 110, 210)
T-CTD bottom	041	834	26/10/10	09:23	10° 0.00' N	17° 0.16' W		Error, new profile after MSS
MSS	018	835	26/10/10	09:53	10° 0.02' N	17° 0.34' W	415	
MSS	019	835	26/10/10	10:17	10° 0.01' N	17° 0.69' W	407	
MSS	020	835	26/10/10	10:42	10° 0.01' N	17° 1.09' W	434	
T-CTD bottom	041	836	26/10/10	11:21	10° 0.01' N	17° 1.55' W	463	Tracer, O2, H2O2/Fe(II), Mn, CDOM
Bio-CTD	042	837	27/10/10	00:52	8° 57.67' N	15° 2.64' W	400	Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	009	838	27/10/10	01:24	8° 57.65' N	15° 2.64' W	50	
T-CTD bottom	043	839	27/10/10	01:51	8° 57.66' N	15° 2.63' W	424	Tracer, O2, Salinity
T-CTD	044	840	27/10/10	05:45	8° 30.01' N	15° 30.02' W	1200	Tracer, O2, Nutrients, Salinity
T-CTD	045	841	27/10/10	10:21	7° 59.95' N	16° 0.03' W	1200	Tracer, H2O2/Fe(II), Nutrients, Salinity
T-CTD	046	842	27/10/10	16:20	8° 0.00' N	17° 0.07' W	1200	Tracer, H2O2/Fe(II), Mn, CDOM, Nutrients, DNA, POC/DOC, Salinity
T-CTD	047	843	27/10/10	22:24	8° 0.03' N	18° 0.07' W	1200	Tracer, Nutrients, Salinity
T-CTD	048	844	28/10/10	04:20	8° 0.02' N	18° 59.99' W	1200	Tracer, Nutrients, Salinity
MSS	021	845	28/10/10	05:24	8° 0.07' N	18° 59.95' W	542	
MSS	022	845	28/10/10	06:11	8° 0.45' N	18° 59.28' W	502	
MSS	023	845	28/10/10	06:40	8° 0.68' N	18° 58.88' W	485	
Plancton net	010	846	28/10/10	07:00	8° 0.82' N	18° 58.65' W	50	
Bio-CTD	049	847	28/10/10	07:08	8° 0.88' N	18° 58.68' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
T-CTD	050	848	28/10/10	12:50	8° 0.11' N	20° 0.01' W	1200	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients
T-CTD	051	849	28/10/10	18:56	8° 0.03' N	20° 59.99' W	1200	Tracer, DOC/PO, DANN, Chl-a, Salinity
MSS	024	850	28/10/10	20:11	8° 0.11' N	20° 59.95' W	543	
MSS	025	850	28/10/10	20:39	7° 59.74' N	20° 59.93' W	547	
MSS	026	850	28/10/10	21:05	7° 59.53' N	20° 59.86' W	556	
T-CTD	052	851	29/10/10	02:56	8° 0.28' N	22° 0.22' W	1200	Tracer, Nutrients, Salinity
MSS	027	852	29/10/10	04:02	8° 0.42' N	22° 0.09' W	456	
MSS	028	852	29/10/10	04:47	8° 0.06' N	21° 59.52' W	519	
MSS	029	852	29/10/10	05:36	7° 59.66' N	21° 58.81' W	437	
Plancton net	011	853	29/10/10	09:55	8° 14.84' N	22° 42.90' W	100	
GLIDER		854	29/10/10	10:07	8° 14.93' N	22° 42.86' W		

Bio-CTD	053	855	29/10/10	10:16	8° 14.97' N	22° 42.82' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
T-CTD bottom	054	856	29/10/10	12:50	8° 3.14' N	22° 59.86' W	4545	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients, Salinity
MSS	030	857	29/10/10	16:56	8° 3.08' N	22° 59.80' W	475	
MSS	031	857	29/10/10	17:39	8° 2.60' N	23° 0.28' W	468	
MSS	032	857	29/10/10	18:24	8° 2.02' N	23° 0.76' W	500	
T-CTD	055	858	29/10/10	19:52	8° 2.16' N	23° 16.80' W	1200	Tracer, Nutrients, DOM, DANN, Salinity
Plancton net	012	859	30/10/10	08:50	8° 0.01' N	25° 29.92' W	100	
Bio-CTD	056	860	30/10/10	09:02	7° 59.98' N	25° 29.93' W	400	O2, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
GO-FLO	009	861	30/10/10	09:48	7° 59.96' N	25° 29.98' W	70	Nutrients, Trace Metals (10, 30, 50)
GO-FLO	010	862	30/10/10	11:30	7° 59.85' N	25° 29.99' W	310	Nutrients, Trace Metals (10, 110, 210)
T-CTD bottom	057	863	30/10/10	13:02	7° 59.95' N	25° 29.99' W	3590	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients, Salinity
Bio-CTD	058	864	31/10/10	10:12	6° 0.03' N	27° 59.90' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	013	865	31/10/10	10:44	6° 0.04' N	27° 59.72' W	100	
MSS	033	866	31/10/10	11:05	5° 59.99' N	27° 59.60' W	556	
MSS	034	866	31/10/10	11:32	5° 59.75' N	27° 59.52' W	550	
MSS	035	866	31/10/10	12:02	5° 59.47' N	27° 59.36' W	545	
T-CTD	059	867	31/10/10	12:38	5° 59.21' N	27° 59.15' W	1200	Tracer, O2, H2O2/Fe(II), Nutrients, Salinity
T-CTD	060	868	31/10/10	19:16	6° 59.99' N	28° 0.00' W	1200	Tracer, Nutrients, POM, DOM, DNA, Salinity
T-CTD	061	869	01/11/10	01:52	8° 0.02' N	28° 0.06' W	1200	Tracer, Nutrients, Salinity
MSS	036	870	01/11/10	02:58	8° 0.08' N	28° 0.03' W	344	
MSS	037	870	01/11/10	03:21	8° 0.11' N	27° 59.71' W	458	
MSS	038	870	01/11/10	03:51	8° 0.07' N	27° 59.27' W	482	
MSS	039	870	01/11/10	04:20	8° 0.05' N	27° 58.86' W	477	
MSS	040	870	01/11/10	05:06	8° 0.04' N	27° 58.16' W	463	
MSS	041	870	01/11/10	05:56	7° 59.97' N	27° 57.58' W	480	
Plancton net	014	871	01/11/10	11:33	9° 0.09' N	28° 0.08' W	100	
GO-FLO	011	872	01/11/10	12:01	9° 0.19' N	28° 0.13' W	400	Nutrients, Sampling for calibrations with filtered seawater (355, 370, 385)
T-CTD bottom	062	873	01/11/10	14:46	9° 0.11' N	28° 0.06' W	5290	Tracer, O2, Nutrients, Salinity
Mesokosmen		874	01/11/10	20:00	9° 0.01' N	27° 59.99' W		Mesokosmen experiment stopped
Bio-CTD	063	874	01/11/10	20:43	9° 0.01' N	27° 59.99' W	400	Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
T-CTD	064	875	02/11/10	02:44	9° 59.97' N	27° 59.96' W	1200	Tracer, Nutrients, Salinity
Bio-CTD	065	876	02/11/10	09:48	11° 0.04' N	28° 0.06' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	015	877	02/11/10	10:21	11° 0.09' N	28° 0.21' W	100	
MSS	042	878	02/11/10	10:49	11° 0.19' N	28° 0.18' W	534	
MSS	043	878	02/11/10	11:30	11° 0.33' N	27° 59.82' W	519	
MSS	044	878	02/11/10	12:07	11° 0.50' N	27° 59.49' W	489	
T-CTD	066	879	02/11/10	12:15	11° 0.50' N	27° 59.49' W	1200	Tracer, O2, H2O2/Fe(II), CDOM, Salinity
T-CTD	067	880	03/11/10	00:17	10° 0.08' N	26° 29.91' W	1200	Tracer, Salinity

GO-FLO	012	881	03/11/10	09:13	10° 0.06' N	24° 59.99' W	70	Nutrients, Trace Metals (10, 30, 50)
Bio-CTD	068	882	03/11/10	09:37	10° 0.03' N	24° 59.98' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	016	883	03/11/10	10:09	10° 0.04' N	24° 59.99' W	100	
GO-FLO	013	884	03/11/10	10:42	10° 0.45' N	24° 59.88' W	310	Nutrients, Trace Metals (10, 110, 210)
T-CTD	069	885	03/11/10	11:40	10° 0.46' N	24° 59.85' W	1200	Tracer, O2, H2O2/Fe(II), Salinity
MSS	045	886	03/11/10	12:44	10° 0.52' N	24° 59.92' W	426	
MSS	046	886	03/11/10	13:12	10° 0.91' N	24° 59.86' W	486	
MSS	047	886	03/11/10	13:37	10° 1.16' N	24° 59.69' W	477	
T-CTD	070	887	03/11/10	19:30	10° 0.02' N	24° 0.00' W	1200	Tracer, POC/DOM, DNA, Salinity
T-CTD	071	888	04/11/10	02:25	9° 59.94' N	22° 59.98' W	1200	Tracer, Nutrients, Salinity
GLIDER		889	04/11/10	10:18	9° 30.09' N	21° 50.75' W		
Bio-CTD	072	890	04/11/10	10:30	9° 30.06' N	21° 50.84' W	400	O2, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	017	891	04/11/10	11:03	9° 30.06' N	21° 50.83' W	100	
T-CTD	073	892	04/11/10	11:35	9° 30.09' N	21° 50.81' W	1200	Tracer, O2, Salinity
MSS	048	893	04/11/10	12:42	9° 30.04' N	21° 50.76' W	490	
MSS	049	893	04/11/10	13:07	9° 29.82' N	21° 50.38' W	487	
MSS	050	893	04/11/10	13:32	9° 29.64' N	21° 50.01' W	476	
T-CTD	074	894	04/11/10	22:24	8° 26.96' N	20° 59.39' W	1200	Tracer, Salinity
T-CTD	075	895	05/11/10	04:32	7° 30.09' N	20° 59.99' W	1200	Tracer, Salinity
Plancton net	018	896	05/11/10	05:33	7° 30.00' N	21° 0.03' W	50	
Bio-CTD	076	897	05/11/10	06:14	7° 30.00' N	20° 59.99' W	400	O2, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
T-CTD	077	898	05/11/10	09:35	7° 0.05' N	20° 59.98' W	1200	Tracer, Salinity
T-CTD	078	899	05/11/10	16:10	6° 0.01' N	21° 0.01' W	1200	Tracer, Nutrients, DOM/POC, DNA, Salinity
T-CTD	079	900	05/11/10	22:22	6° 0.11' N	20° 0.02' W	1200	Tracer, Salinity
MSS	051	901	06/11/10	04:42	6° 0.02' N	18° 58.70' W	506	
MSS	052	901	06/11/10	05:24	5° 59.99' N	18° 59.32' W	497	
MSS	053	901	06/11/10	06:05	5° 59.99' N	18° 59.82' W	513	
Bio-CTD	080	902	06/11/10	06:13	6° 0.00' N	18° 59.91' W	400	O2, H2O2/Fe(II), Mn, CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	019	903	06/11/10	06:45	6° 0.01' N	18° 59.96' W	100	
T-CTD bottom	081	904	06/11/10	07:26	6° 0.00' N	19° 0.00' W	4723	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients, Salinity
T-CTD	082	905	06/11/10	20:20	5° 0.10' N	19° 59.92' W	1200	Tracer, Nutrients, DOM/POC, DNA, Salinity
T-CTD	083	906	07/11/10	02:51	5° 0.02' N	20° 59.82' W	1200	Tracer, Nutrients, Salinity
Bio-CTD	083	907	07/11/10	09:01	4° 0.05' N	20° 59.89' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	019	908	07/11/10	09:35	4° 0.06' N	20° 59.89' W	100	
T-CTD	085	909	07/11/10	10:11	4° 0.09' N	20° 59.86' W	1200	Tracer, O2, Nutrients, Salinity

T-CTD	086	910	07/11/10	16:32	3° 0.05' N	21° 0.02' W	1200	Tracer, O2, H2O2/Fe(II), CDOM, Nutrients, DNA, POC, Salinity
MSS	054	911	08/11/10	05:03	1° 57.36' N	23° 1.44' W	554	
MSS	055	911	08/11/10	05:49	1° 57.68' N	23° 0.83' W	463	
MSS	056	911	08/11/10	06:40	1° 57.95' N	23° 0.11' W	498	
GO-FLO	014	912	08/11/10	06:46	1° 57.94' N	23° 0.06' W	70	Nutrients, Trace Metals (10, 30, 50)
Plancton net	020	913	08/11/10	07:11	1° 57.98' N	23° 0.08' W	100	
Bio-CTD	087	914	08/11/10	07:22	1° 57.96' N	23° 0.07' W	400	O2, H2O2/Fe(II), Mn, CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
GO-FLO	015	915	08/11/10	08:06	1° 57.70' N	22° 59.79' W	310	Nutrients, Trace Metals (10, 110, 210)
T-CTD	088	916	08/11/10	08:57	1° 57.70' N	22° 59.86' W	1200	Tracer, H2O2/Fe(II), Mn, CDOM, Nutrients, Salinity
T-CTD	089	917	08/11/10	15:24	2° 59.99' N	23° 0.04' W	1200	Tracer, O2, H2O2/Fe(II), Nutrients, DNA, Salinity
T-CTD	090	918	08/11/10	23:42	4° 0.09' N	23° 59.93' W	1200	Tracer, Salinity
MSS	057	919	09/11/10	00:44	4° 0.28' N	23° 59.77' W	390	
MSS	058	919	09/11/10	01:14	4° 0.66' N	23° 59.39' W	400	
MSS	059	919	09/11/10	01:41	4° 0.82' N	23° 58.91' W	316	
Bio-CTD	091	920	09/11/10	07:21	4° 3.01' N	22° 58.00' W	400	O2, H2O2/Fe(II), Mn, CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	021	921	09/11/10	07:50	4° 3.01' N	22° 57.99' W	100	
T-CTD	092	922	09/11/10	08:32	4° 3.03' N	22° 57.99' W	1200	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients, Salinity
MSS	060	923	09/11/10	09:50	4° 3.12' N	22° 57.94' W	497	
MSS	061	923	09/11/10	10:28	4° 3.51' N	22° 57.84' W	490	
MSS	062	923	09/11/10	10:56	4° 3.78' N	22° 57.77' W	516	
T-CTD	093	924	09/11/10	18:12	5° 3.96' N	22° 59.92' W	1200	Tracer, O2, Nutrients, POM, DNA, Salinity
MSS	060	925	09/11/10	19:17	5° 3.94' N	22° 59.70' W	428	
MSS	061	925	09/11/10	19:44	5° 3.79' N	22° 59.81' W	483	
MSS	062	925	09/11/10	20:13	5° 3.61' N	22° 59.93' W	485	
T-CTD	094	926	10/11/10	01:44	6° 0.06' N	23° 0.01' W	1200	Tracer, Nutrients
MSS	063	927	10/11/10	02:45	6° 0.00' N	22° 59.99' W	490	
MSS	064	927	10/11/10	03:11	5° 59.79' N	23° 0.09' W	480	
MSS	065	927	10/11/10	03:36	5° 59.59' N	23° 0.15' W	470	
Bio-CTD	095	928	10/11/10	09:16	6° 59.96' N	23° 0.10' W	400	O2, H2O2/Fe(II), Mn, CDOM, Nutrients, DOM, Chl-a, POM, DNA, N2-fixation
Plancton net	022	929	10/11/10	09:49	7° 0.02' N	23° 0.03' W	100	
T-CTD	096	930	10/11/10	10:22	7° 0.18' N	23° 0.06' W	1200	Tracer, O2, H2O2/Fe(II), Mn, CDOM, Nutrients, Salinity
T-CTD	097	931	10/11/10	16:52	8° 2.94' N	23° 0.05' W	1200	Tracer, O2, Nutrients, POM, DNA, Salinity, H2O2/Fe(II)
T-CTD	098	932	10/11/10	22:42	9° 0.00' N	22° 59.96' W	1200	Tracer, Nutrients
MSS	066	933	10/11/10	23:47	9° 0.03' N	22° 59.99' W		
MSS	067	933	11/11/10	00:20	9° 0.33' N	23° 0.13' W	480	
MSS	068	933	11/11/10	00:46	9° 0.13' N	22° 59.94' W	500	
MSS	069	933	11/11/10	01:11	8° 59.89' N	22° 59.90' W	480	
Bio-CTD	099	934	11/11/10	09:33	10° 29.99' N	23° 0.03' W	400	O2, H2O2/Fe(II), CDOM, Nutrients, DOM, Chl-a, POM, DNA

Plancton net	023	935	11/11/10	10:06	10° 30.03' N	23° 0.09' W		
T-CTD	100	936	11/11/10	10:38	10° 30.02' N	23° 0.02' W	1200	Tracer, Nutrients
T-CTD	101	937	11/11/10	17:58	11° 30.04' N	23° 0.05' W	1200	Tracer, Nutrients
T-CTD	102	938	12/11/10	04:02	12° 59.98' N	22° 59.86' W	1200	Tracer
T-CTD	103	939	12/11/10	10:33	13° 59.88' N	23° 0.02' W	1200	no sample